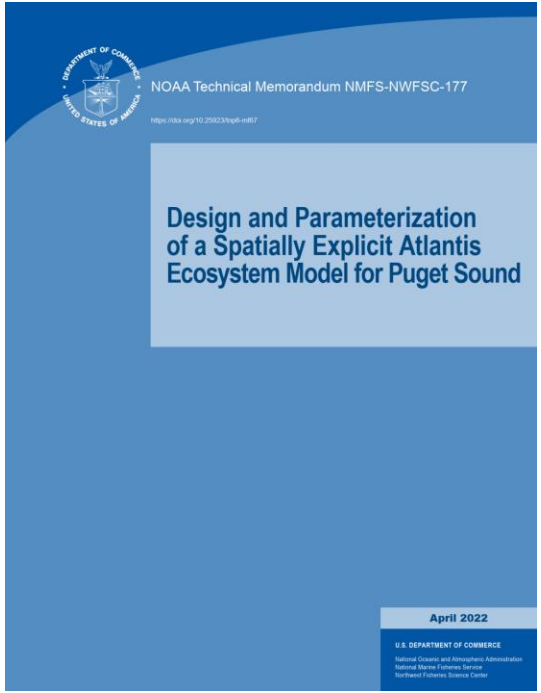
Phytoplankton dynamics in the Atlantis model for Puget Sound

Hem Nalini Morzaria-Luna

Long Live the Kings



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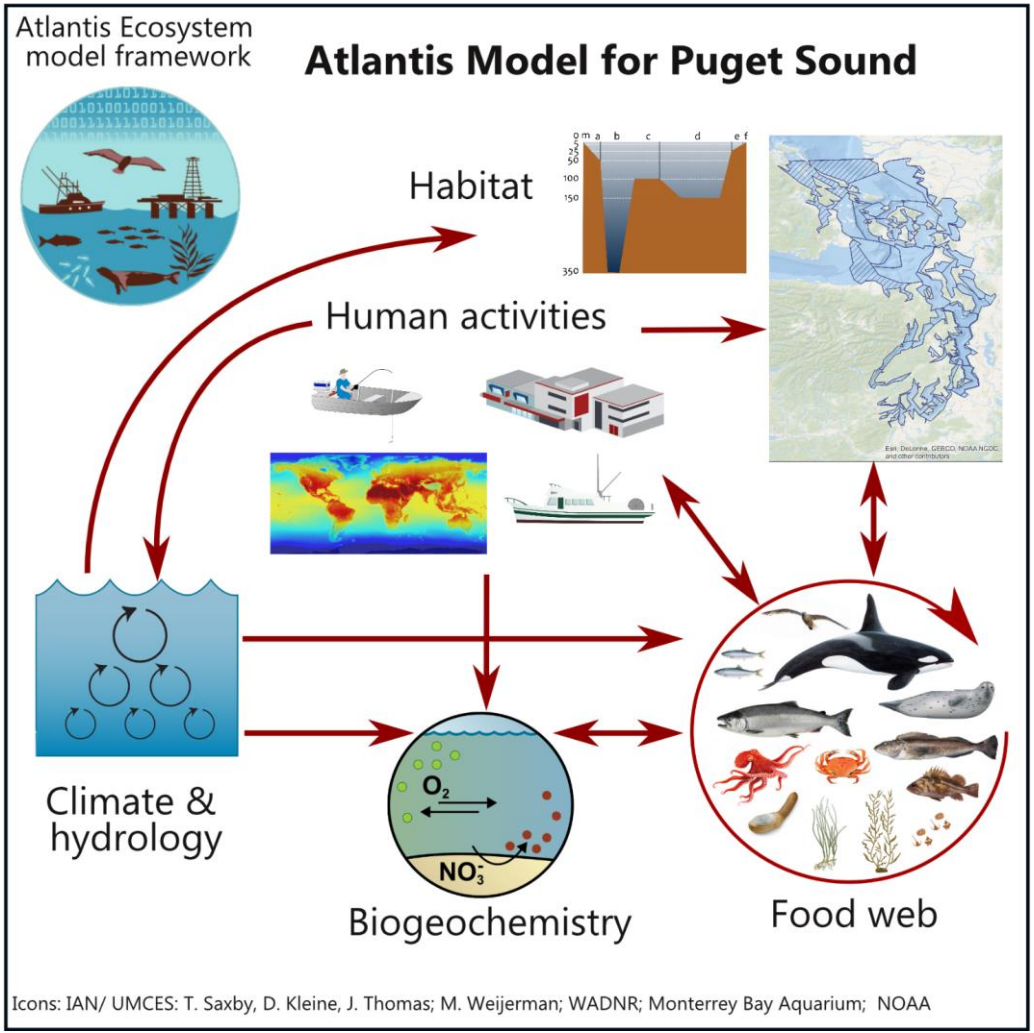
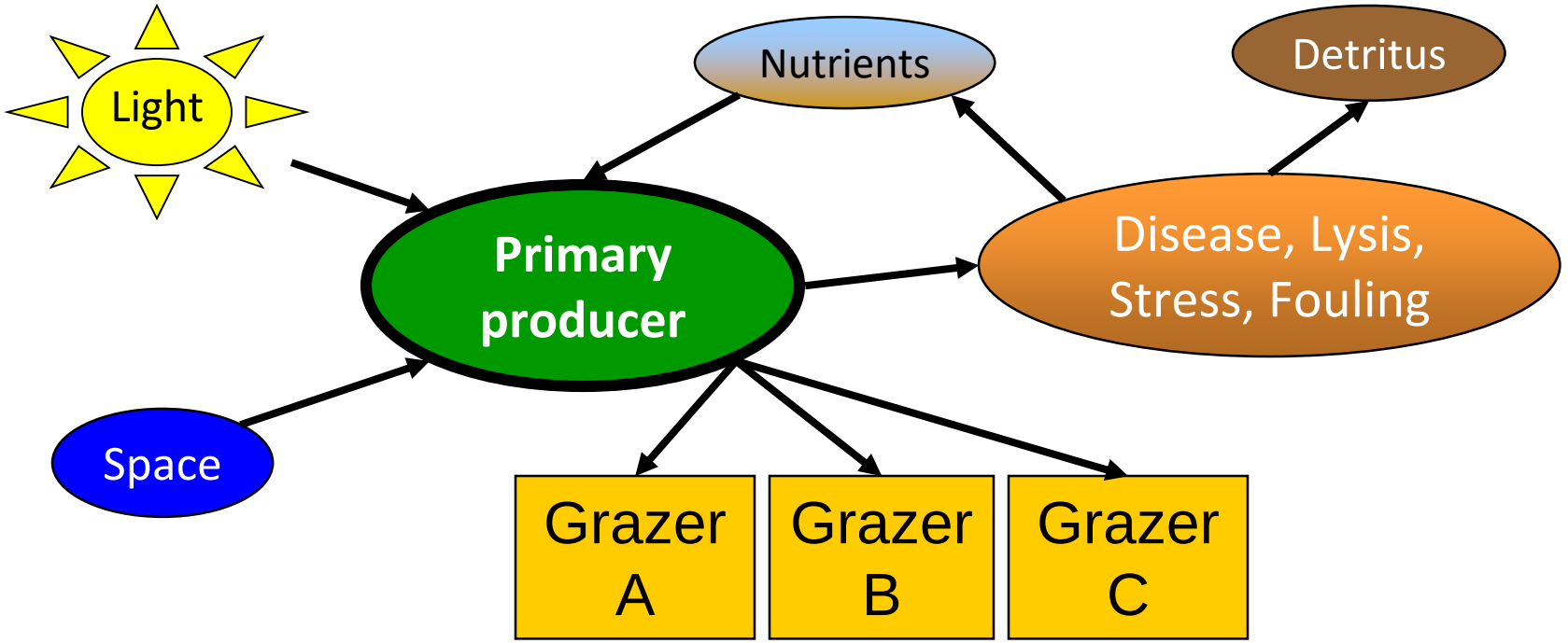


Phytoplankton functional groups

- Large phytoplankton: Diatoms and coccolithophorids
- Small phytoplankton: Dinoflagellates and phytoflagellates

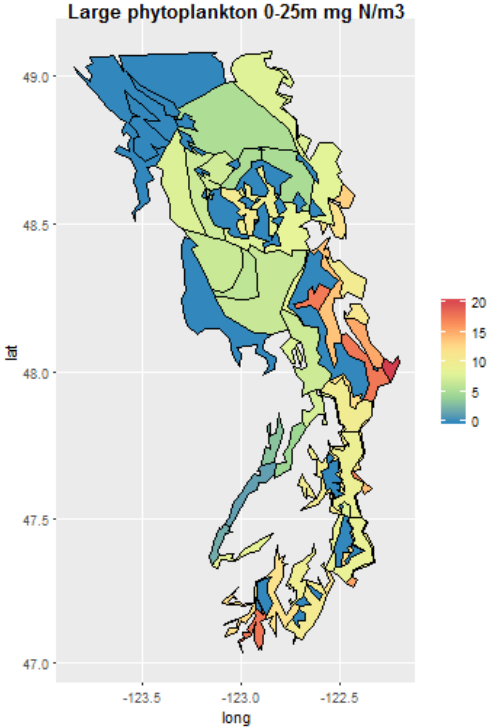
Food web linkages based on diet proportions

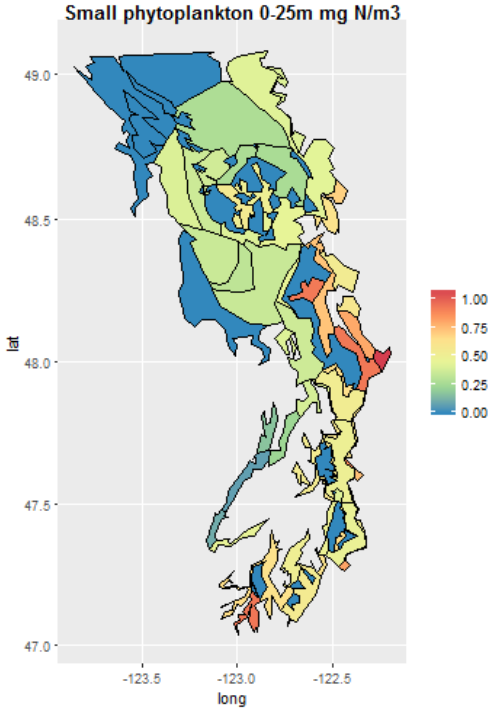
Primary producers



$$\frac{dP}{dt} = \mu \cdot P \cdot \delta_{light} \cdot \delta_{nut} \cdot \delta_{space} - M_{linear} - \sum_{grazers} M_{grazing}$$

Phytoplankton distribution





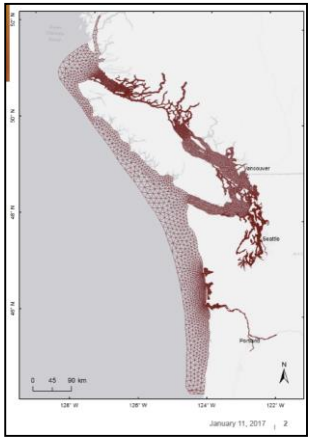
- Total chlorophyll from MERIS satellite data, 300 m resolution (2002-2012, European Space Agency, B. Sackman and B. Leonard of Integral Consulting).
- Concentrations of chlorophyll were applied to photic layers in the AMPS (0–5 m and 5–25 m).
- Abundance was based on biovolume data (2014–17, King County phytoplankton monitoring at six stations in Central Puget Sound; K. Stark and G. Hannach, King County Department of Natural Resources and Parks).
- Estimate: 95% of biovolume was diatoms (Large phytoplankton group) and 5% was dinoflagellates or other phytoplankton (Small phytoplankton group).
- Assumed that biovolume was proportional to carbon content and converted to N.

Puget Sound Integrated Modeling Framework

The AMSP will be part of a multi-model platform to understand processes across the whole-basin and the land-sea interface in Puget Sound

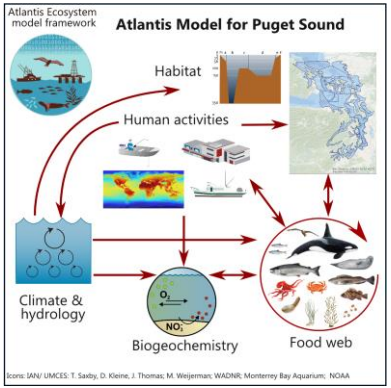
Salish Sea Model

Pacific Northwest National Laboratory, UW Salish Sea Modeling Center



http://salish-sea.pnnl.gov/

Phytoplankton



Thank you

Hemnalini.MorzariaLuna@noaa.gov

More on Atlantis:

Audzijonyte et al. (2019). Methods in Ecology and Evolution 10 (10), 1814-1819